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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION

OF

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FOR

EXERCISE DEVICE

BACKGROUND OF THE INVENTION

The invention relates to exercise devices and more specifically to an exercise device for the hand and arms.

DESCRIPTION OF THE PRIOR ART

Various prior art devices are available for exercising the muscles of the hand and arms. Such devices range from spring operated squeeze devices to various shaped bodies of elastic materials. For example, tennis balls have been used as hand exercise devices. The effectiveness and ease of use of such prior art devices is determined by the extent to which such devices complement the natural shape and function of the hand.

For example, tennis balls have the characteristics that the spherical outer surface does not complement the natural form of the hand. As a result, the little and first finger contact the surface at an angle tending to cause these fingers to slip as the ball is squeezed.

Additionally, it is desirable that exercise devices of this type be easy to carry so they may be utilized during spare moments which might otherwise be wasted.

Factors which must be considered in selecting an exercise device which complements the human hand include the structural complexity of the hand and the associated muscles. If the exercise device is to be squeezed, it is preferable that the device permit the fingers of the hand to be positioned in their natural position. This requires that each of the fingers be closed (curved) by substantially the same amount. Additionally, it is preferable that the thumb not interfere with the fingers.

SUMMARY OF THE INVENTION

The exercise device which is the subject of this invention complements the natural contours of the human hand and provides an effective mode of exercise. Additionally, the exercise device is

easy to transport. For example, the exercise device may be carried in the pockets of men's trousers or in ladies' purses.

The preferred embodiment of the invention comprises a body of soft and flexible elastic material having a curved outer surface. The curved outer surface has a curvature which complements the structure of the human hand. The body of material is generally "egg-shaped" with the larger end portion complementing the thumb portion of the hand while the smaller portion complements the remainder of the human hand.

More specifically, the invention includes a body of elastic material including a selectively curved continuous and uninterrupted outer surface and having a major axis and a minor axis perpendicular to said major axis; the major axis coincides with the maximum cross-sectional diameter of the body of elastic, and the minor axis coincides with the maximum cross-sectional diameter of the body of material in a plane perpendicular to the major axis. The body includes first and second portions defined by a plane passing through the minor axis and perpendicular to the major axis; this plane also divides the maximum cross-sectional diameter into two unequal parts. The outer curved surface of said first portion has a selectively varying curvature with the maximum curvature corresponding to a region adjacent to the major axis; the outer surface of said second portion has a selectively varying curvature with the maximum curvature corresponding to a region adjacent the major axis. The maximum curvature of said first and second portions are different to define an outer surface which is symmetrical about its major axis and asymmetrical about its minor axis. Generically, this results in a generally "egg shaped device".

The exercise device can be constructed in various sizes with the relative dimensions adjusted for differences in the human hand. Best results are normally achieved when the dimensions are selected such that a line passing through the tips of the first and little

finger is substantially parallel the major axis of the device with the tips of the second and ring finger spaced from the palm of the hand. Additionally, all fingers should extend around the device a distance to more than one half the circumference of the device.

Alternatively, the invention may be described as a body of elastic material which includes a curved outer surface, symmetrical about its major axis and asymmetrical about its minor axis; the body including first and second generally dome-shaped portions defined by a plane passing through the minor axis and perpendicular to the major axis; selected regions of the outer curved surface of the first and second portions being selectively contoured thereby rendering the body asymmetrical about the minor axis.

The above embodiment of the invention, illustrates the salient structural characteristics of the invention, and includes a central portion having a larger circumference than the differently contoured curved end portions. The central and end portions may be individually contoured to complement different portions of the hand. Additionally, the contoured outer surface complements the natural form of the human hand, as subsequently described in detail.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an isometric drawing illustrating the invention;

Fig. 2 is a pictorial drawing illustrating the use of the invention; and

Fig. 3 is a cross-sectional view of the device along a plane passing through the major axis and minor axis of the device.

DESCRIPTION OF THE INVENTION

Fig. 1 is a pictorial drawing illustrating the preferred embodiment of the invention. This embodiment includes a body of elastic material 10 which has an outer curved surface which is generally "egg-shaped". As with all bodies of this general shape,

the body includes a major axis 12 which coincides with the maximum cross-sectional diameter of the body. Similarly, a minor axis 14 corresponds to the maximum cross-sectional diameter in a plane perpendicular to the major axis 12. Generically, the body of elastic material 10 can be accurately described as "egg-shaped". Experiments have demonstrated and the drawings illustrate that this shape complements the natural form of the closed human hand, as subsequently described in detail.

Body 10 is a solid body of material which is substantially homogeneous throughout. The material is a visco-elastomer or a visco-elastic urethane such as soft and flexible polyurethane. The material is sold under the trademark SORBOTHANE by Sorbothane, Inc., Kent, Ohio, U.S.A. This material has quasi-liquid properties and faultless memory which enables it to return to its original shape, even after repeated compressions. Additionally, the properties of the material remain stable over a broad temperature range.

The body of elastic material 10 is symmetrical about its major axis and asymmetrical about its minor 14 axis. As discussed below and illustrated in Fig. 2, the end portions of the body of material 10 adjacent the major axis has little contact with the hand during use. The end portions of the preferred embodiment can be accurately described as "dome shaped".

In use, the exercise device is intended to be held in the hand and repetitively squeezed and released. To illustrate this mode of use, the preferred embodiment of the exercise device is illustrated in Fig. 2 as held in a human hand 18. As can be seen from this figure, the second finger 22 generally curves around the exercise device in an area which is near its maximum circumference around the device. Similarly, the first finger 24 curves around the larger end of the device permitting the thumb 26 to extend over the end. Similarly, the ring finger 28 and the little finger 30 curve around the end portion having a smaller diameter. Additionally, it

should be noted that the central portion of the exercise device is positioned in the palm of the hand. This being the case, the generally egg-shaped outer surface of the exercise device is particularly advantageous in that it complements the natural shape of the human hand permitting all portions of the hand to be conveniently exercised by alternately squeezing and releasing the device.

When the fingers close around the device as seen in Fig. 2, the circumference of the device about axis 12 varies in accordance with the length of the fingers. Accordingly, finger 22, which is the longest finger, extends around the largest circumference; fingers 24 and 28 which are shorter fingers extend around a smaller circumference; and finger 30 which is a still shorter finger extends around an even smaller circumference. When the fingers are positioned as shown in Fig. 2, the angular relationship of the finger portions at the finger joints of each of the fingers is approximately the same and the inner surfaces of the fingers and the palm of the hand defines an overall surface substantially complementary to the outer surface of the exercise device. As the device is squeezed, the range of motion is approximately the same for all the fingers and the squeezing effort will be properly distributed between the fingers.

Referring to Fig. 3, it will be seen that the minor axis 14 lies in a plane perpendicular to the major axis, this plane dividing the maximum cross-sectional diameter of the body into two unequal parts 34 and 36. This plane also divides the body into first and second portions 38 and 40 as seen in Fig. 1

The exercise device which is the subject of this invention can be easily varied for individuals having varying degrees of physical strength as well as physical size. To conform to human hands of various sizes, it is simply necessary to form the egg-shaped bodies such that it is smaller or larger as desired. The elasticity constant of the material can be varied to change the rigidity of

the device. Additionally, the device may be made in various colors to specifically appeal to individuals of varying taste. Promotional messages may be printed on the exterior surface permitting the device to be used as a promotional device for various businesses.

The invention has been described above with reference to a preferred embodiment; however, it will be appreciated by those skilled in the art that many variations of the basic invention can be made, all of which are within the concept of the invention. The smooth, uninterrupted, continuously changing radius of curvature disclosed is the most efficient embodiment of the invention.

As can be seen from the above discussion, there is little or no contact between the hand and the regions of the smaller end portion near the major axis 12. Also, contact between the hand and regions of the larger end near the major axis 12 is limited to the thumb. The salient feature of all of these embodiments is to contour the outer surface of the device to complement the features of the hand, with the generally egg-shaped form believed to be the best embodiment. Advantages of the egg-shaped design include its simplicity and non-critical size. However, the size may be scaled for use by individuals ranging from children to adults.